**Chapter 8**

PROBLEM 8-5

a. 

 2011 sales were 122.72% of those in 2010.

b. 

 2011 net earnings were 100.80% of those in 2010.

 Net Income Before Minority Share of

c. 1. Net Profit Margin = Earnings Equity Income and Nonrecurring Items

 Net Sales

 2011 2010

  

 Net Income Before Minority Share of

 2. Return on Assets = Earnings and Nonrecurring Items

 Average Total Assets

 2011 2010

  

 3. Total Asset Turnover = 

 2011 2010

  

 1.12 times per year 1.10 times per year

 4. DuPont Analysis: Return on = Net Profit x Total Asset

 Assets Margin Turnover

 2011 10.42\* = 9.39% x 1.11

 2010 12.72\* = 11.56% x 1.10

 \*Rounding causes the difference from the 10.38% and 12.67% computed in (2).

 5.

|  |  |  |
| --- | --- | --- |
|  |  2011 |  2010 |
| Operating income Net sales Less: Cost of product sold Research and develop- ment expenses General and sellingOperating income  | $1,589,150 $ 651,390 135,314 526,680 $ 275,766 | $1,294,966 $ 466,250 113,100 446,110 $ 269,506 |

 Operating Income Margin = 

 2011 2010

  

 = 17.35% = 20.81%

 6. Return on Operating Assets = 

 2011 2010

  

 = 19.53% = 23.24%

 7. Operating Asset Turnover = 

 2011 2010

  

 = 1.13 times = 1.12 times

 per year per year

 8. DuPont Analysis with Operating Ratios:

Return on = Net Profit x Total Asset

 Assets Margin Turnover

 2011 19.61%\* = 17.35% x 1.13

 2010 23.31%\* = 20.81% x 1.12

 \*Rounding causes the difference from the 19.53% and 23.24% computed in (6).

 Net Income Before Minority Share

 of Earnings and Nonrecurring Items +

 9. Return on Investment = [(Interest Expense) **×** (1 − Tax Rate)]

 Average (Long-Term Liabilities) + Equity

|  |  |  |
| --- | --- | --- |
|  |  2011 |  2010 |
| Net earnings before minority shareInterest expenseEarnings before taxProvision for income taxTax rate1 – tax rateInterest expense x (1 – tax rate)Net earnings before minority share + [interest expense x (1 – tax rate)]Long-term debt and equityReturn on investment | $ 149,260 18,768 263,762 114,502 43.4% 56.6% 10,623  159,883 1,019,420 15.7% | $ 149,760 11,522 271,500 121,740 44.8% 55.2% 6,360 156,120 933,232 16.7% |

 Net Income Before Nonrecurring

 10. Return on Common Equity = Items − Preferred Dividends

 Average Common Equity

 2011 2010

  

 = 17.06% = 19.03%

d. Profits in relation to sales, assets, and equity have all declined. Turnover has remained stable. Overall, although absolute profits have increased in 2011 compared with 2010, the profitability ratios show a decline.

PROBLEM 8-6

 Net Income Before Minority Share of Earnings

a. 1. Net Profit Margin = Equity Income and Nonrecurring Items

 Net Sales

|  |  |  |
| --- | --- | --- |
|  2011 |  2010 |  2009 |
|  |  |  |
|  = 6.07% |  = 3.96% |  = 3.76% |

 Net Income Before Minority Share of

 2. Return on Assets = Earnings and Nonrecurring Items

 Average Total Assets

|  |  |  |
| --- | --- | --- |
|  2011 |  2010 |  2009 |
|  |  |  |
|  = 6.74% |  = 4.21% |  = 3.82% |

 3. Total Asset Turnover = 

|  |  |  |
| --- | --- | --- |
|  2011 |  2010 |  2009 |
|  |  |  |
| = 1.11 times per year | = 1.07 times per year | = 1.02 times per year |

 4. DuPont Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return onAssets | = | Net Profit Margin | x | Total AssetTurnover |
| 2011: 6.74%2010: 4.24%2010: 3.84% | === | 6.07% 3.96%\*3.76%\* | xxx | 1.11 times1.07 times1.02 times |

 \*Rounding difference from the 4.21% and 3.82% computed in (2).

 5. Operating Income Margin = 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| (2) Net salesLess: Material and manufacturing costs of products soldResearch and developmentGeneral and selling(1) Operating income(1) Divided by (2) | $1,600,000 740,000 90,000 600,000$1,430,000$ 170,000 10.63% | $1,300,000 624,000 78,000 500,500 $1,202,500$ 97,500 7.50% | $1,200,000 576,000 71,400 465,000$1,112,400$ 87,600 7.30% |

 6. Return on Operating Assets = 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
|  Operating Income\_\_\_\_\_Average Operating Assets |  $170,000 $1,390,200 = 12.23% |  $97,500  $1,160,000 = 8.41% |  $87,600 $1,090,000 = 8.04% |

 7. Operating Asset Turnover = 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
|  Net Sales\_\_\_ \_ Average Operating Assets | $1,600,000$1,390,200= 1.15 times | $1,300,000$1,160,000= 1.12 times | $1,200,000$1,090,000= 1.10 times |

 8. DuPont Analysis with Operating Ratios

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return onAssets | = | Net Profit Margin | x | Total AssetTurnover |
|  2009: 12.22%\* 2010: 8.40%\* 2011: 8.03% | === | 10.63% 7.50% 7.30% | xxx | 1.151.121.10 |

 \*Rounding difference from the 12.23%, 8.41%, and 7.98% computed in (6).

 Net Income Before Minority Share of

 Earnings and Nonrecurring Items +

9. Return on Investment = [Interest Expense **×** (1 − Tax Rate)]

 Average (Long-Term Liabilities + Equity)

 Estimated tax rate:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  2011 |  2010 |  2009 |
| (1) Provision for income taxes(2) Earnings before income taxes and minority equity(1) **÷** (2)1 – tax rate(3) Interest expense x (1 – tax rate)$19,000 x 61.00%$18,200 x 59.00%$17,040 x 58.00%(4) Earnings before minority equity(3) + (4) (A)(5) Total long-term debt(6) Total stockholders’ equity(5) + (6) (B)(A) **÷** (B) | $ 62,049$ 159,10039.00%61.00%11,59097,051108,641211,100811,2001,022,30010.63% | $ 35,731$ 87,15041.00%59.00%10,73851,41962,157121,800790,100911,9006.82% | $ 32,659$ 77,76042.00%58.00%9,88345,10154,984214,000770,000984,0005.59% |

 Net Income Before Nonrecurring Items –

 10. Return on Total Equity = Dividends on Redeemable Preferred Stock

 Average Total Equity

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| Net income etc.Average total equity |  $86,851 $811,200 |  $42,919 $790,100 |  $37,001 $770,000 |

 = 10.71% = 5.43% = 4.81%

b. All ratios computed indicate a significant improvement in profitability.

PROBLEM 8-7

 Net Income Before Minority Share of

a. 1. Net Profit Margin = Earnings Equity Income and Nonrecurring Items

 Net Sales

|  |  |  |
| --- | --- | --- |
|  2009 |  2010 |  2011 |
|  $171,115 $1,002,100= 17.08% | $163,497$980,500= 16.67% | $143,990$900,000= 16.00% |

 Net Income Before Minority Share of

 2. Return on Assets = Earnings and Nonrecurring Items

|  |  |  |
| --- | --- | --- |
|  2009 |  2010 |  2011 |
| $171,115$839,000= 20.40% | $163,497$770,000= 21.23% | $143,990$765,000= 18.82% |

 3. 

|  |  |  |
| --- | --- | --- |
|  2009 |  2010 |  2011 |
| $1,002,100 $839,000= 1.19 times per year | $980,500$770,000= 1.27 times per year | $900,000$765,000= 1.18 times per year |

 4. DuPont Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return onAssets | = | Operating IncomeMargin | x | Total AssetTurnover |
| 2009: 20.33%\*2010: 21.17%\*2011: 18.88%\* | === | 17.08%16.67%16.00% | xxx | 1.19 times per year1.27 times per year1.18 times per year |

 \*Rounding difference from the 20.40%, 21.23%, and 18.82% computed in (2).

 Net Income Before Minority Share of

 Earnings and Nonrecurring Items +

 5. Return on Investment = [Interest Expense x (1 − Tax Rate)]

 Average (Long-Term Liabilities) + Equity

 Estimated tax rate:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  2009  |  2010 |  2011 |
| (1) Provision for income taxes(2) Earnings before income taxestax rate [(1) **÷** (2)]1 – tax rate(3) Interest expense x (1 − tax rate)$14,620 x 59.50%$12,100 x 59.00%$11,250 x 57.70%(4) Net earnings(3) + (4) (A)(5) Average long-term debt(6) Average shareholders’ equity(5) + (6) (B)(A) **÷** (B) | $116,473$287,58840.50%59.50%8,699171,115179,814120,000406,000526,00034.19% | $113,616$277,11341.00%59.00%7,139163,497170,636112,000369,500481,50035.44% | $105,560$249,55042.30%57.70%6,491143,990150,481101,000342,000443,00033.97% |

 Net Income Before Nonrecurring Items −

 6. Return on Total Equity = Dividends on Redeemable Preferred Stock

 Average Total Equity

|  |  |  |  |
| --- | --- | --- | --- |
|  |  2009 |  2010 |  2011 |
| Net earningsAverage total equity | $171,115$406,000= 42.15% | $163,497$369,500= 44.25% | $143,990$342,000= 42.10% |

 7. 

|  |  |  |
| --- | --- | --- |
| 2009 | 2010 | 2011 |
| $1,002,100 $302,500= 3.31 | $980,500$281,000= 3.49 | $900,000$173,000= 5.20 |

b. The ratios computed indicate a very profitable firm. Most ratios indicate a very slight reduction in profitability in 2009.

 Sales to fixed assets has declined materially, but this is the only ratio for which the trend appears to be negative.

PROBLEM 8-8

 Net Income Before Minority Share of

a. 1. Net Profit Margin = Earnings Equity Income and Nonrecurring Items

 Net Sales

|  |  |  |
| --- | --- | --- |
|  2011 |  2010 |  2009 |
| $20,070 − $8,028$297,580= 4.05% | $16,660 − $6,830$256,360= 3.83% | $15,380 − $6,229$242,150= 3.78% |

 2. 

|  |  |  |
| --- | --- | --- |
|  2011 |  2010 |  2009 |
| $20,070 − $8,028$145,760= 8.26% | $16,660 − $6,830$137,000= 7.18% | $15,380 − $6,229$136,000= 6.73% |

 3. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| $297,580$145,760= 2.04 times per year | $256,360$137,000= 1.87 times per year | $242,150$136,000= 1.78 times per year |

 4. DuPont Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return onAssets | = | Operating IncomeMargin | x | Total AssetTurnover |
| 2011: 8.26%2010: 7.16%\*2009: 6.73% | === | 4.05%3.83%3.78% | xxx | 2.04 times1.87 times1.78 times |

 \*Rounding difference from the 7.18% computed in (2).

 5. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| $ 26,380$297,580= 8.86% | $ 22,860$256,360= 8.92% | $ 20,180$242,150= 8.33% |

 6. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2011 | 2009 |
|  $26,380 $89,800 + $45,850= 19.45% |  $22,860 $84,500 + $40,300= 18.32% |  $20,180 $83,100 + $39,800= 16.42% |

 7. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| = 2.19 times per year | = 2.05 times per year | = 1.97 times per year |

 8. DuPont Analysis with Operating Ratios

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return onAssets | = | Operating IncomeMargin | x | Total AssetTurnover |
| 2011: 19.40%\*2010: 18.29%\*2009: 16.41%\* | === | 8.86%8.92%8.33% | xxx | 2.19 times2.05 times1.97 times |

 \*Rounding difference from the 19.45%, 18.32%, and 16.42% computed in (6).

 9. 

|  |  |  |
| --- | --- | --- |
|  2011 |  2010 |  2009 |
|  $91,580 $297,580= 30.77% |  $80,060 $256,360= 31.23% |  $76,180 $242,150= 31.46% |

b. Net profit margin and total asset turnover both improved. This resulted in a substantial improvement to return on assets.

 Operating income margin declined slightly in 2009 after a substantial improvement in 2010. Operating asset turnover improved each year. The result of the improvement in operating income margin and operating asset turnover was a substantial improvement in return on operating assets.

 Gross profit margin declined slightly each year.

 Overall profitability improved substantially over the three-year period.

PROBLEM 8-9

a. 1. 

|  |  |  |  |
| --- | --- | --- | --- |
|  |  2011 |  2010 |  2009 |
| (A)(B) | $ 2,100,000$ 2,600,000 7,000,000 100,000 10,000,000$19,700,000 | $ 1,950,000$ 2,300,000 6,200,000 100,000 9,000,000$17,600,000 | $ 1,700,000$ 2,200,000 5,800,000 100,000 8,300,000$16,400,000 |
| (A) ÷ (B) |  10.66% |  11.08% |  10.37% |

 Net Income Before Minority Share of

 Earnings and Nonrecurring Items +

 2. Return on Investment = [Interest Expense x (1 − Tax Rate)]

 Average (Long-Term Liabilities + Equity)

 Estimated tax rate:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| (1) Provision for income taxes(2) Income before taxTax rate = (1) **÷** (2)1 – tax rate(3) Interest expense x (1 – tax rate)$800,000 x 58.33%$600,000 x 57.35%$550,000 x 61.82%(4) Net income(3) + (4) (A)Long-term debtPreferred stockCommon equity(B)(A) **÷** (B) | $ 1,500,000 3,600,00041.67%58.33%$ 466,640$ 2,100,000$ 2,566,640$ 7,000,000100,000 10,000,000$17,100,00015.01% | $ 1,450,0003,400,00042.65%57.35%$ 344,100$ 1,950,000$ 2,294,100$ 6,200,000100,000 9,000,000$15,300,00014.99% | $ 1,050,0002,750,00038.18%61.82%$ 340,010$ 1,700,000$ 2,040,010$ 5,800,000100,000 8,300,000$14,200,00014.37% |

 Net Income Before Nonrecurring Items −

3. Return on Total Equity = Dividends on Redeemable Preferred Stock

 Average Total Equity

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| = 20.79% | = 21.43% | = 20.24% |

 Net Income Before Nonrecurring

4. Return on Common Equity = Items − Preferred Dividends

 Average Total Equity

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| = 20.86% | = 21.51% | = 20.31% |

b. Return on assets improved in 2010 and then declined in 2011. Return on investment improved each year. Return on total equity improved and then declined. Return on common equity improved and then declined.

 In general, profitability has improved in 2010 over 2009 but was down slightly in 2011.

c. The use of long-term debt and preferred stock both benefited profitability.

 Return on common equity is slightly more than return on total equity, indicating a benefit from preferred stock.

 Return on total equity is substantially higher than return on investment, indicating a benefit from long-term debt.

PROBLEM 8-10

a. Sales $120,000

 Gross profit (40%) 48,000

 Cost of goods sold (60%) $ 72,000

 Beginning inventory $ 10,000

 + Purchases 100,000

 Total available $110,000

 − Ending inventory ?

 Cost of goods sold $ 72,000

 Ending inventory ($110,000 − $72,000) $ 38,000

b. If gross profit were 50%, the analysis would be as follows:

 Sales $ 120,000

 Gross profit (50%) 60,000

 Cost of goods sold (50%) $ 60,000

 Beginning inventory $ 10,000

 + Purchases 100,000

 Total available $ 110,000

 − Ending inventory 50,000

 Cost of goods sold $ 60,000

 If gross profit were higher, the loss would be higher.

PROBLEM 8-11

|  |  |  |  |
| --- | --- | --- | --- |
|  | NetProfit | RetainedEarnings | TotalStockholders’ Equity  |
| a. A stock dividend is declared and paid.b. Merchandise is purchased on credit.c. Marketable securities are sold above cost.d. Accounts receivable are collected.e. A cash dividend is declared and paid.f. Treasury stock is purchased and recorded at cost.g. Treasury stock is sold above cost.h. Common stock is sold.i. A fixed asset is sold for less than book value.j. Bonds are converted into common stock. | 00+00000−0 | −0+0−000−0 | 00+0−−++−+ |